

## **Ontario technology can fuel emission-free GO trains; World's first hydrogen-powered train runs on Canadian-made fuel cell engines**

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### **Body**

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There's no better time to think big about the future of passenger rail in Ontario, so it's encouraging that Transportation Minister Steven Del Duca wants to study the idea of putting hydrogen-powered trains on GO regional lines, as the Star reported last week.

It wouldn't be the first time the Liberal government travelled down these tracks. It's a distant memory now, but former premier Dalton McGuinty announced ambitious plans a decade ago for Ontario to be a global leader in the development of "hydrails" - trains powered by fuel cells that run on emission-free hydrogen.

"It's our goal to get a prototype on the rails here in Ontario within three years of the project launch," McGuinty said in 2007, while visiting the Bombardier manufacturing plant in Thunder Bay. The government was reportedly in "early-stage talks" with Bombardier to design and develop the clean locomotive in Ontario, which would showcase the technology to the world.

That project never launched, and a decade later the world's first fuel cell passenger train running on hydrogen is now being showcased in Germany, not Ontario. It's called the Coradia iLint, designed and manufactured by French industrial giant Alstom, which conducted the train's first test run in March. Passengers will get a chance to start riding it in 2018.

But here's the twist: the fuel cell engines powering the Coradia iLint were designed and manufactured by Ontario's own Hydrogenics. The Mississauga-based company has a 10-year, \$70-million agreement with Alstom to supply at least 200 of these core engine systems.

It's a huge deal for a Canadian company with less than 200 employees and about \$30 million in revenue in 2016. But Hydrogenics can't rest on its laurels. It will need to secure follow-on orders and new customers to stay ahead of global competitors.

Which brings us back to Ontario, and the important role it can play showcasing local cleantech innovations to the world.

It's unclear why McGuinty's hydral ambitions went off the rails, but the province's \$13.5 billion regional express rail (RER) program offers an opportunity to get fuel cell trains back on track. In addition to launching a study and public consultation process on electrifying GO lines, Del Duca has committed to a feasibility study of the hydrogen train option, citing "potentially a ton of upside" from the technology.

Indeed, hydrogen fuel cells have several advantages over diesel engines. They are nearly silent, which is a significant bonus given the number of communities that GO trains pass through.

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They also emit zero pollution, with water as the only byproduct. Diesel exhaust, on the other hand, is a nasty mix of ultrafine particles and black carbon that can contribute to respiratory and cardiac disease. As a major source of greenhouse gases, diesel trains also fly in the face of the province's ambitious climate action plan.

Hydrogen trains also have an edge over conventional electric trains.

For one, there's no need to build expensive overhead infrastructure. All that's needed are a few strategically located hydrogen quick-fill stations along target routes.

The hydrogen itself can be generated on-site using emission-free electricity from the grid to drive industrial electrolysis, a method of splitting water molecules into hydrogen and oxygen.

There would be no more need for imported diesel. Surplus electricity we normally export at a heavy discount or loss to other jurisdictions could instead be used to create clean fuel for GO trains in Ontario.

And because hydrogen can be stored and used later, we would have the flexibility to only produce the fuel when electricity is cheap and clean, such as overnight when there is more wind, hydro and nuclear power available than the province can normally use.

A GO train hydrogen fuelling infrastructure would, in this way, double as tool for managing and balancing the grid. It would draw electricity when it makes most sense, not just when the trains are running.

This is a new way of thinking about passenger rail infrastructure in Ontario, but as Del Duca said, the decision will have to last for a generation and beyond.

It's an approach to procurement that could just as easily apply to road tolls, EV charging, public buildings and waste management.

There are better, cleaner and smarter ways to build the infrastructure that will carry us into the future, and if we look harder, we might just find the solutions in our own back yard.

Tyler Hamilton is senior manager of cleantech partnerships at MaRS Discovery District.

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